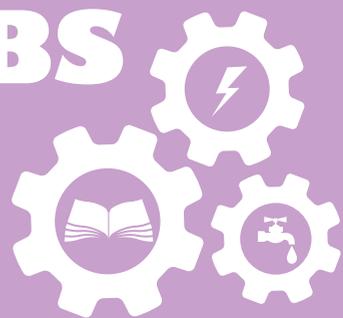




IMPACTLABS



Information Booklet

<http://impactlabs.mit.edu>

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Introduction

ImpactLabs was recently launched by students and graduates of the Massachusetts Institute of Technology (MIT) and Harvard University to provide hands-on engineering design and education to students in developing countries. A core component of the program is the development of innovative solutions to problems that students identify in their communities. The pilot program took place in Lagos, Nigeria in August 2014.

Our aim is to help high school and university students use technology to solve problems in their communities using local resources. We plan to organize yearly summer workshops and support exciting student projects over the course of

the year. High school students develop a sense of social responsibility as well as creative problem solving skills, while undergraduate students supplement their regular classes with hands-on implementation experiences.

A future goal of ImpactLabs is to establish a design workshop so that students can continue to develop innovative solutions beyond their summer workshop experiences.

“Our aim is to help high school and early university students use technology to solve problems in their communities using local resources.”



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Themes

The ImpactLabs curriculum is inspired by MIT's design for development (D-Lab) program which focuses on optimizing technologies for developing countries. Each year, ImpactLabs develops and runs a workshop based on a selection from the following themes:

Development - addressing how the quality of life of low-income households can be improved by adaptation of low-cost and sustainable technologies.

Energy - engaging students in understanding and addressing the applications of compact, robust and low-cost alternative energy technology including, micro-hydro, solar, or wind turbine generators along with

theoretical analysis, design, prototype construction, evaluation and implementation.

Education - emphasizing experiential and project-based learning to nurture creativity in youth around science, technology, engineering, and math. Application of modern best practices to overcoming education challenges such as limited resources, language barriers, large class sizes, and entrenched pedagogy are discussed.

Waste - emphasizing the multi-disciplinary approach necessary to understand waste management in low-and-middle-income countries with case

studies on successful waste management businesses.

Health - exploring how to design medical technologies that address local health problems and discussing in-depth the current state of global and local health challenges.

Design - addressing problems faced by underserved communities with a focus on design, experimentation, and prototyping of products that significantly improve lives in these communities.



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Team 

ImpactLabs was founded by individuals who have participated in or developed similar programs in multiple countries.



Joy Ekuta,
MIT SB '13

Brain and Cognitive Scientist

Experience: developed learning program in Israel and Jamaica, co-founded educational initiative in Mexico, oversaw and developed curriculum for health education programs in Guatemala and St. Vincent.



Mureji Fatunde, Harvard AB '12, LSE MSc '13

Biomedical Engineer

Experience: worked on a D-Lab Health medical device project in Nicaragua, worked for the malaria control program of an NGO in Bangladesh, conducted medical device policy research in Switzerland.



Nwike Iloeje,
MIT SM '11

PhD Candidate in Mechanical Engineering

Experience: worked on a D-Lab Energy solar water heating project in Brazil, developed designs for thermal management devices in buildings in France.



Tunde Alawode,
MIT SM '14, '15

PhD Candidate in Mechanical Engineering

Experience: developed a STEM program in Israel and a mentorship program for Nigerian undergraduates.

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Pilot Project:

ImpactLabs Nigeria 2014

Workshop themes: Energy and Water

Venue: Faculty of Engineering,
University of Lagos, Nigeria.

Date: 18th - 29th August 2014

Participants: 3 instructors, 22
students

Background lessons:

Energy
Water
Biomass

Hands-on design and construction:

- Solar water heater
- Biogas digester

- Clean-burning charcoal
- Desalination device
- Corn sheller
- Independent design and
building of societally-relevant
devices

Career Development:

- Two career exposure sessions
- Presentation/elevator pitch
training session
- Five external speakers who are
successful Nigerian engineers

The summer workshop
culminated in a final public
presentation by the students
on 29 August.



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Pilot Project: ImpactLabs Nigeria 2014

Students were placed in teams of 4-5 members to design and construct original ideas on a budget of N5000 (US\$32). Final team projects included the following:

Team 'NOVA: *Water level alert system for community pumps or private homes in Lagos.* The team used a mechanical configuration interfaced with an arduino-based controller to build a system capable of automatically controlling a pump/alarm system in response to tank water depth

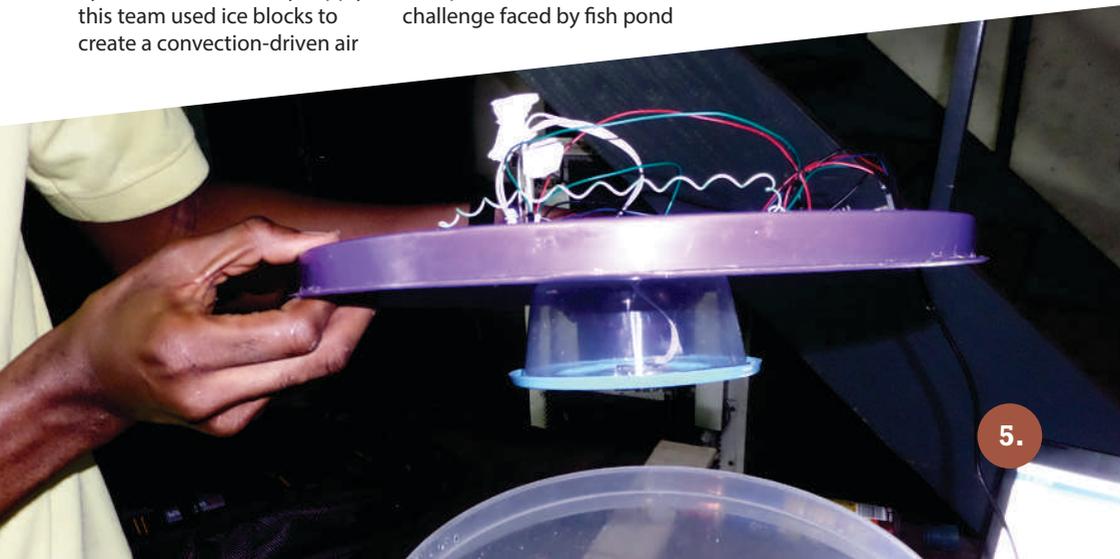
Team Dynamic Impact: *Cheap and reliable air conditioning for poorer households.* Motivated by unreliable electricity supply, this team used ice blocks to create a convection-driven air

conditioning system from recycled computer parts. The air conditioner can be powered using batteries or an electrical outlet.

Team Mercury: *Desalination and water level alert system for commercial or private use.* Using only tin cans, wood, pipes and buckets, this team built a solar powered desalination device that bubbles hot air through salt water and subsequently condenses out the accumulated water vapor. They also designed an ultrasound based water level detector interfaced a pump/alarm system managing a tank pumping system.

Team FOSTA: *Water purification system for fish ponds and a low-cost solar purifier.* This team solved the challenge faced by fish pond

owners of having to change the pond water in batches while having no way to extract nutrients for farm use. They built a water purification system which automatically extracts useful fish droppings, and they proposed a method for continuous recirculation. Their second device was a cost-efficient tool to passively purify dirty or seawater for drinking using cut-out plastic buckets, a transparent film and recycled metal handles.



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Testimonials



"It was really great to work with the ImpactLabs team this summer, and I am looking forward to working with the same team again or working on individual projects. [They] did a great job by bringing the summer school to Nigeria. It's a turning point in my life. I have some few ideas of what I can work on, but they are still kind of sketchy. For the meantime, I plan to enroll in an online programming class-I think this will help in future projects."

- Demilade Oyedele, ImpactLabs '14,
recent high school graduate.



"It is a privilege and great opportunity to be part of the success of the first edition of the ImpactLabs Nigeria program. In fact, I was positively affected by the program-I now approach my teaching practically, adopting the MIT style of practical questions and illustrations of engineering principles."

- Dr Ola Kamiyo, Senior Lecturer,
Department of Mechanical Engineering,
University of Lagos.

Plans

■ The future of ImpactLabs will feature:

- ⚙ Annual summer workshops.
- ⚙ A permanent Maker Lab, or innovation hub, for local community members to develop home-grown solutions with resource and personnel support from MIT and other institutions.
- ⚙ An innovation repository for individuals from Africa and other developing countries to share ideas and inventions.

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